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KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE

**RESPONSE TO USEPA'S JULY 2008 COMMENTS
AND MDEQ'S AUGUST 2008 COMMENTS
ON THE APRIL 2008 GENERALIZED CONCEPTUAL SITE MODEL**

Comment 1 (MDEQ): Section 1.2

The report often only discusses the three former impoundments and describes the Otsego City and Plainwell #2 dam impoundments as other areas that are less studied. The CSM should communicate to the reader that all dam impoundments have acted to retain polychlorinated biphenyl (PCB) contaminated sediments and help the reader understand any differences between the impoundments.

Response:

The goal of the Generalized CSM is to present, from an overall perspective, potential contaminant sources, fate and transport routes, and exposure pathways for the Site based on existing data. As stated in Section 1.2, the Otsego City Impoundment and the area around the Plainwell No. 2 Dam have not been the subject of any significant historical investigations. In Section 1.5 in the discussion of ongoing sources, the text reads "A similar mechanism of bank erosion may be a factor in the Otsego City Impoundment and the Plainwell No. 2 Dam area, but these areas have not been studied as extensively. The Plainwell No. 2 Dam area is currently being investigated as part of the Area 1 SRI sampling effort, and the Otsego City Impoundment will be assessed as part of Area 2 activities."

At this point in the information gathering process, it would not be appropriate to modify the document to present information on how the Otsego City Impoundment and the area around the Plainwell No. 2 Dam are different from the three former impoundments at Plainwell, Otsego, and Trowbridge. The information we do have at this point needs to be evaluated in the field to determine how the Generalized CSM will need to be modified in the Area-specific CSMs. We do expect to find some differences that may be important. The Plainwell No. 2 Dam was a completely different type of structure from the other four – it was a diversionary structure and did not impound water to the same degree or create a consistently inundated area that was later exposed – so there is no equivalent formerly impounded area to investigate. As for the Otsego City Impoundment, the stretch upstream of the dam is a high energy braided area – this is different from the three former impoundments – and the structure was never owned or maintained by the state. Current data suggest that the magnitude of drawdown at Otsego City was less than in the state-owned impoundments and the impacts on the banks is different, but we need more data to better describe the banks, the bank stability, and PCB concentrations in the area.

No changes to the report will be made in response to this comment.

Comment 2 (MDEQ): Section 1.2

The Biota discussion bullet in this section states, "These data establish that PCB concentrations in fish are the key risk driver for both human and ecological receptors at the Site." Change the wording to "...fish are 'a' key risk driver..."

Response:

PCBs in fish tissue have long been recognized as the key risk driver at the Site. In the USEPA-approved Risk Assessment Framework it states, "PCBs (assessed primarily as total PCBs via SW-846 Method 8082) will be evaluated as the primary constituent of concern (COC) for both the ecological and human health risk assessments." Nevertheless, since the exposure pathway discussion has been reserved for future documents, we will make the wording change requested above.

Comment 3 (MDEQ): Section 1.2

Table 1-1 – OU1 – “Installed groundwater monitoring network (monitored quarterly) and groundwater recovery and treatment system.” Identifying that “quarterly monitoring” is being conducted at the site is misleading as monitoring usually implies chemical analyses. The document should be modified to reflect that the collection of static water levels is the majority of the activity.

Response:

Table 1-1 will be modified to clarify that the ongoing groundwater monitoring effort is focused primarily on water level readings.

Comment 4 (MDEQ): Section 1.2

Table 1-1 – Planned actions for Willow Blvd./A-Site include, “Removal of 13,800 cy [cubic yards] materials – planned for 2008.” The table should be changed to reflect that material is being “consolidated” and provide a reasonable date.

Response:

The text in Table 1-1 will be modified as follows: “*Removal of approximately 13,800 cy [cubic yards] of materials and consolidation with other materials onsite – planned for 2008-2010.*”

Comment 5 (USEPA): Section 1.3

Page 1-10, Section 1.3, 5th paragraph. Based on USEPA Original Specific Comment #4, the text in the CSM was revised to:

“Since then, characteristics of PCB transport have shifted emphasis to resupply from the exposed former sediments in the former impoundments and from the sediment bed to the water column in many areas of the river.”

This revision addresses the contribution from floodplain inundation, but not groundwater.

Response:

The paragraph this text is excerpted from discusses the change in the direction of net transfer reversing from the water column to the sediments such that the net transfer is from sediments (exposed former sediments and river sediments) to the water column. The discussion does not provide any comprehensive discussion of other sources or transfer mechanisms from sediments/soils to the water column. The paragraph immediately following the text (see below) that is the subject of this comment does address both the possible contribution of groundwater as a potential source mechanism and floodplain inundation.

Monitoring of bank profiles (Rheaume et al. 2002) and modeling studies (Wells et al. 2003, Wells et al. 2007, Langendoen and Wells 2006, Syed et al. 2005) have shown erosion of banks in the former impoundments to be a significant continuing external source mechanism, delivering PCB-impacted materials to the river sediments and water column. Uncertainty remains concerning the magnitude of other potential source mechanisms associated with the exposed former sediments, such as periodic inundation of portions of the exposed sediment and groundwater flow through these materials [highlight added]. Water column monitoring shows that the formerly impounded sections of the river are a source of PCBs to the water column. In Lake Allegan, water column monitoring at the lake inlet and outlet conducted by MDEQ have shown that the sediments of Lake Allegan continue to be a net sink for PCBs transported from upstream (MDEQ 2007).

No further changes to the report are necessary.

Comment 6 (MDEQ): Section 1.3

The last sentence of the first paragraph that states, "This chemical affinity for solids makes sediment in depositional areas the ultimate sink for PCBs and, to a more limited extent, the sediments can act as a reservoir supplying PCBs to the water column and biota within the aquatic ecosystem." should be removed. Depositional areas may have a tendency to accumulate more PCB impacted material than erosional areas but do not act as an "ultimate sink," and the role of the sediment to supply PCBs up the food chain may not be so limited.

Response:

We do not agree that the sentence in question should be removed, but instead will modify the text as follows: *"This chemical affinity for solids makes sediment in depositional areas a the ultimate sink for PCBs. Under certain conditions, these and, to a more limited extent, the sediments can act as a reservoir supplying PCBs to the water column and biota within the aquatic ecosystem."*

Comment 7 (MDEQ): Section 1.3

The sentence that indicates, "In future sampling and analysis efforts, quantifying the PCB mixtures present in Site media will likely be useful in developing an understanding of the potential current and future influence of different sources of PCBs." should be removed. This concept is in reference to Aroclor mixtures, which can alter when released into the environment and are problematic for fingerprinting PCB sources.

Response:

The intent of the sentence above was to refer to the quantification of PCB congeners, not Aroclor mixtures. To clarify this point and to recognize the uncertainty associated with such and effort, we will modify the text as follows: *"In future sampling and analysis efforts, quantifying the PCB ~~mixtures~~ congeners present in Site media may ~~will likely be~~ useful in developing an understanding of the potential current and future influence of different sources of PCBs."*

Comment 8 (USEPA): Section 1.4

Page 1-11, Section 1.4, 2nd Paragraph. The revised text states:

"The composition of PCBs in fish and sediment samples from the Site indicate that while the Kalamazoo River Study Group (KRSBG)'s paper recycling facilities have contributed PCBs to the Kalamazoo River system, there is evidence that there are sources of PCBs other than paper recycling. The majority of the PCBs in fish samples from Bryant Mill Pond (adjacent to the Allied Paper, Inc. OU) have been quantified as Aroclor 1242, which is the primary PCB mixture found in the carbonless copy paper that was historically recycled by Kalamazoo Valley paper mills. In contrast, nearly 100% of the PCBs in fish collected from Morrow Lake, which upstream of the Site and all KRSBG facilities, are quantified as Aroclors 1254 and 1260 – Aroclors that cannot be attributed to paper recycling. Fish collected in the former Trowbridge Impoundment, which is within the Site, contain PCBs quantified as both Aroclor 1242 and Aroclor 1254, indicating a combined influence of both paper and non-paper sources of PCBs."

The text has not been revised in response to USEPA Original Specific Comment #6:

"The discussion of PCB sources and PCB composition in fish is not supportable by Aroclor analyses. The appearance of a particular Aroclor in a fish sample does not mean that the fish has the congener composition of the Aroclor, and the proportional Aroclor composition in fish samples cannot be directly attributed to different Aroclor sources."

The other discussions related to source allocation and fingerprinting based on Aroclor data that were included in the draft CSM appear to have been deleted or revised.

Response:

A number of revisions were made in response to USEPA's Original Specific Comment #6 that specifically addressed the concern regarding inferences of PCB sources from fish tissue PCB Aroclor data. It is appropriate to use the indications from available data at the Site to assess the potential contributions of different source Aroclors known to have been released from different areas of the Site. To address USEPA's further comment on this issue, the subject text will be modified (as shown below) to discuss what is indicated by the data as contributions from different Aroclor mixtures, but will clearly acknowledge the uncertainty and potential need for further analysis (as the revised Generalized CSM does). This is an important issue with respect to the Generalized CSM given the potential influence of upstream, heavier PCB mixtures from Morrow Lake on PCB levels in fish as fish PCB levels decline toward the lowest consumption advisory thresholds. This issue may require specific consideration by USEPA in risk-management decision-making and it is a topic that applies across the Site. As such, it warrants inclusion in the Generalized CSM.

"The composition of PCBs in fish and sediment samples from the Site indicate that while the KRSG's paper recycling facilities have contributed PCBs to the Kalamazoo River system, there is evidence that there are sources of PCBs other than paper recycling. While quantitation of PCB as a particular Aroclor in a fish sample does not mean that the fish has the congener composition of the source Aroclor, and the proportional quantified Aroclor composition of PCB in fish samples cannot be directly attributed to different source Aroclors, the available fish PCB data indicate the potential for certain PCB mixtures to have had a disproportionate influence on fish PCB levels. The majority of the PCBs in fish samples from Bryant Mill Pond (adjacent to the Allied Paper, Inc. OU) have been quantified as Aroclor 1242, which is the primary PCB mixture found in the carbonless copy paper that was historically recycled by Kalamazoo River Valley paper mills. In contrast, nearly 100% of the PCBs in fish collected from Morrow Lake, which is upstream of the Site and all KRSG facilities, are quantified as Aroclors 1254 and 1260 – Aroclors that cannot be attributed to paper recycling. Fish collected in the former Trowbridge Impoundment, which is within the Site, contain PCBs quantified as both Aroclor 1242 and Aroclor 1254, indicating suggesting that a combined influence of both paper and non-paper sources of PCBs may be present in fish tissue.

"Standards representing the different Aroclors are used to quantify total PCB results, and it is important to understand that there is some uncertainty associated with the correspondence of the Aroclor standards used in the laboratory to the PCB mixtures in source material from the Site. The quantification of specific Aroclor mixtures in fish tissue (and other types of biota samples) is affected by metabolism and a variety of physical and biological processes that can differentially affect uptake and retention in fish tissue of the PCB congeners of the original PCB mixture released to the environment. Environmental transport and dechlorination processes can also alter the congener composition of PCB mixtures over time. As a result, Aroclor mixtures can become more difficult to identify as the original mixture becomes altered through environmental and biological processes. The quantification of specific Aroclors based on standards used for Total PCB quantification can, however, be a useful indicator as to the potential importance of different source Aroclors in affecting the PCB mixture in samples. Other methods, including congener analysis, can provide greater insights into how PCBs from various source mixtures may contribute to Total PCB concentrations. ~~A more detailed understanding of~~ This may be useful in understanding potential contribution of residual sources of different Aroclors to future concentrations of PCBs in fish tissue at the Site."

Comment 9 (MDEQ): Section 1.4

The report goes too far with a discussion of site conditions using existing Aroclor analyses. The discussion of PCB source and distribution using only Aroclor analyses is fraught with technical issues. The current re-draft of the CSM acknowledges, to some degree, the limitation of such an assessment when it states, "Other methods, including congener analysis, can provide greater insights into how PCBs from various source mixtures may contribute to Total PCB concentrations." The rather detailed discussion of source contribution, based on the limited insight that Aroclor analyses offers, should be removed from the CSM.

Response:

A recognition of potential sources of PCBs other than the paper recycling properties is appropriate given the propensity for heavier mixtures from upstream sources to disproportionately influence exposure. PCB quantitation using Aroclor analyses form the vast majority of Site-specific PCB measurements, and the potential influence of different PCB mixtures is a critical aspect of fate and transport issues at the Site. While the use of Aroclor analyses is limited in some regards as described in the response to Comment 8 above, is an important tool that can and should be considered in overall Site management. The Generalized CSM report appropriately addresses the uncertainty associated with these analyses and does not overstate their influence. No further changes to the report are necessary.

Comment 10 (MDEQ): Section 1.5

Previous comments have indicated that groundwater must be recognized as an "ongoing source" of PCB to the river in this report. **There are two groundwater related pathways that must be recognized separately in the report.** One is the infiltrating groundwater exposed to the influences of the contaminated landfill operable unit wastes, the exposed former sediments, and contaminated floodplain soil which eventually discharges into the river. The other is a result of the upward vertical transport of groundwater exposed to the contaminated sediments immediately before discharge into the river. The former pathway is limited to areas where the source material exists as landfill, exposed sediments, or contaminated floodplain. The latter pathway may be complete wherever contaminated sediments exist in the river.

The response to the comment regarding the recognition of groundwater as an "ongoing source" (See response to comments, April 18, 2008), included a classification of certain sources as "internal" and "external". If the USEPA determines that it is appropriate to classify sources as external or internal, then a definition of the terms and a clear distinction between the various sources should be provided in the report. If the USEPA determines that it is not appropriate to classify sources as external or internal, then the classification should be removed from the report.

Response:

The groundwater-related pathways discussed in the first paragraph above are more appropriately described as mechanisms of transport, not to be confused with potential pathways by which human or ecological receptors may be exposed to PCB-containing media. Groundwater transport mechanisms are specifically identified in Section 1.5 as an area of uncertainty that will be explored as appropriate as part of the Area-specific investigations.

The mechanism described above as the "upward vertical transport of groundwater exposed to the contaminated sediments immediately before discharge into the river" is not ultimately a groundwater mechanism, but rather a sediment-based mechanism that may be influenced by groundwater flow. This mechanism will also be explored, as appropriate, as part of the Area-specific investigations.

The distinction between external and internal sources of PCBs was included only in the April 2008 comment/response document; those terms were not incorporated into the report. No changes are necessary to address the second paragraph of the comment above.

Comment 11 (MDEQ): Section 3.5

A number of sediment transport processes affecting sediment stability and the fate and transport within the sediment are identified in this section. The transport processes related to groundwater must also be identified in this section. Wherever the upward vertical transport of groundwater is exposed contaminated sediments, there exists a potential for upward migration of PCB through the bed material.

Response:

The following sentence will be added to the end of the third paragraph in Section 3.5: "In addition, the potential influence of venting groundwater (i.e., groundwater flowing vertically upward through the sediment bed into the river), which can impact the fate of PCBs in sediment by facilitating the release of PCBs through enhanced pore water advection, will be evaluated on an Area-specific basis, as appropriate."

Comment 12 (MDEQ): Section 4

Groundwater monitoring data obtained from operable unit investigations should be recognized in this section. Contaminated groundwater has been identified at the operable units. Although groundwater will be investigated in the Plainwell Impoundment, and elsewhere, the data set that currently exists should not be ignored.

Response:

The focus of Section 4 and the entire Generalized CSM report is the Kalamazoo River itself (Operable Unit 5). The conditions at the landfill operable units and the groundwater monitoring data collected at those locations – which in some cases do show PCB detections in shallow groundwater that the State of Michigan asserts have the potential to act as a source mechanism to surface water – are being considered and addressed as part of the process at each individual operable unit. There are groundwater seeps at the Allied Paper, Inc. Operable Unit (Allied OU) where elevated levels of PCBs have been detected that are potentially impacting Portage Creek, but again, that situation is being addressed as part of the Remedial Investigation/ Feasibility Study process at the Allied OU.

As discussed in the responses to previous comments, the potential transport of PCBs via groundwater will be addressed in each Area-specific investigation. No changes to the report are necessary.

Comment 13 (USEPA): Section 4.1

Page 4-2, Section 4.1. This section states "In general, the PCB concentrations throughout the river are low..."

This section should be limited to a description of PCB distributions and concentrations, without including an opinion about the significance of the measured concentrations.

Response:

The paragraph this text is excerpted from provides quantitative support for the statement that concentrations are generally low. To address USEPA's sensitivity to describing the PCB data as low, the text will be modified to just refer to the data statistics. The sentence that this text is taken from will simply be deleted.

Comment 14 (USEPA): Section 4.1:

The discussion of sampling results from 1993/94 is misleading in that its treatment of the data appears to be designed to support the conclusion presented in the first sentence that concentrations are generally low.

Response:

The paragraph states that localized higher concentrations of PCBs occur in certain areas of the Site, particularly within the former impoundments (i.e., the former impoundments at Plainwell, Otsego, and Trowbridge). The much lower concentrations throughout much of the rest of the Site in comparison to the levels measured in the former impoundments is an important aspect of the CSM – as is the fact that we do have so-called “hotspots” in some areas. To address USEPA’s concern that the discussion is misleading, the following paragraph will be added as the third paragraph in Section 4.1 (after the inset Figure 4-1) to provide further clarity:

“Relatively higher PCB concentrations occur in the three former impoundments at Plainwell, Otsego, and Trowbridge – where PCB concentrations range up to 160 mg/kg – and in other very localized areas along free-running reaches of the river. Ninety percent of the sediment and exposed former sediments in the Plainwell, Otsego, and Trowbridge Impoundments are below 17 mg/kg. The median concentrations of PCB data from river sediments in these areas is 0.073 mg/kg with a range of ND to 160 mg/kg. The median concentration of PCB data from the exposed former sediments in the Plainwell, Otsego, and Trowbridge Impoundments is 2.0 mg/kg with a range of ND to 130 mg/kg. PCB concentrations in the two largest existing impoundments – the Allegan City Impoundment and Lake Allegan – range from ND to 86 mg/kg with a median concentration of 1.2 mg/kg.”

Comment 15 (MDEQ): Section 4.1

The report indicates that, “Sediment bed mixing and in-bed PCB transport processes...can supply PCBs to the bioavailable zone; however, in the absence of significant influence of these processes, PCBs deeper in the sediment are unavailable to biota...” This language implies that the influence of “in-bed” PCB transport processes is insignificant. The significance of these processes (e.g., discharging groundwater and hyporheic flow) remains undefined and should not be assumed. The last sentence in this paragraph should be deleted and the potential significance of these “in-bed” PCB transport processes should be recognized in this report.

Response:

The full sentence in question reads as follows: “Sediment bed mixing and in-bed PCB transport processes (e.g., pore water diffusion) can supply PCBs to the bioavailable zone; however, in the absence of significant influence of these processes, PCBs deeper in the sediment bed are unavailable to biota (normal bioturbation processes only affect surface sediments in the bioavailable zone).” In no way does this sentence imply that transport of PCBs from the sediment bed is insignificant, and no assumptions about the impact or significance of other process is stated or implied. We agree that the significance of the mechanisms for groundwater transport and its influence on sediment transport are unclear. To clarify this point, the following sentence will be added after the sentence quote above: “The impact of mechanisms such as discharging groundwater and hyporheic flow on sediment bed stability are undetermined at this point, and will be assessed as appropriate as part of the Area-specific investigations.”

Comment 16 (USEPA & MDEQ): Section 4.3

Page 4-6, Section 4.3, 3rd paragraph:

- a. USEPA: This text states “In 2001, USEPA conducted Phase I and Phase II sampling in the former Plainwell Impoundment to provide additional measurements of PCBs in the exposed sediment at locations intentionally biased toward areas of elevated PCB...”

MDEQ had commented (PCB Sediment Data – Section 4.3) that representing the USEPA 2001 sample design as biased was inaccurate.

MDEQ: The report indicates that, “*On average, the distribution of PCB concentration in the exposed sediments was represented by the 1993/1994 RI [remedial investigation] sampling program. In 2001, USEPA conducted Phase I and Phase II sampling in the former Plainwell Impoundment to provide additional measurements of PCBs in the exposed sediment at locations intentionally biased toward areas of elevated PCB.*” This language was commented on after inclusion in the previous draft, and the response to comments included: “*The discussion will be revised to reflect that the additional focused measurements targeted specific areas, including some with elevated PCB concentrations.*” However, this language has not been incorporated into the current draft. The report should include the language agreed to above (“i.e., “...that the additional focused measurements targeted specific areas, including some with elevated PCB concentrations...”).

- b. USEPA: This paragraph goes on to conclude that “This suggests that the distribution of PCB concentrations may be adequately represented by sampling programs that provide uniform coverage rather than targeted sampling approaches since available data indicate these small pockets of relatively high concentrations (i.e. “hot spots”) are present only on a limited spatial extent.”

However, KRSG’s response indicated that they would revise this paragraph to indicate that “the average concentration did not change significantly as a result of the additional focused sampling efforts conducted following the systematic sampling program implemented in 1993/1994.”

Response:

To address comment 16a, the sentence in question will be revised as follows: “*In 2001, USEPA conducted Phase I and Phase II sampling in the former Plainwell Impoundment to provide additional measurements of PCBs in the exposed sediment at focused locations – including some with intentionally biased toward areas of elevated PCB concentrations – and to further characterize the area.*”

To address comment 16b, the sentence will be revised as previously indicated. This was an oversight.

Comment 17 (USEPA): Section 4.3

There are several places in Section 4.3 where KRSB appears to be laying the groundwork for justifying uniformly-spaced, unbiased sampling approaches for future sampling efforts. This conclusion is not appropriate for a CSM document. The rationale and justification for a particular sampling approach should be provided in area-specific SAPs [sampling and analysis plans].

Response:

It is agreed that the rationale and justification for a particular sampling approach should be provided in Area-specific work plans. Although this comment indicates a conclusion regarding a sampling methodology is indicated in the CSM, there are in fact no conclusions regarding any sampling approach presented in the report. Therefore, no changes are planned to the text in response to this comment. The basis for future sampling methodologies will indeed be specified in Area-specific sampling plans.

Comment 18 (MDEQ): Section 4.3

The report indicates that, *"The spatially-weighted average concentration (SWAC) of PCB in the surface soils is 17 mg/kg [milligrams per kilogram] based on 2001 USEPA data alone, and 16 mg/kg based on the 2001 USEPA and 1993/1994 RI data together. This suggests that the distribution of PCB concentrations may be adequately represented by sampling programs that provide uniform coverage rather than targeted sampling approaches since available data indicate these small pockets of relatively high concentrations (i.e., hot spots) are present only on a limited special extent."* The practical equivalence of this language was included in the previous draft, and the response to comments included that, *"The sentence at issue will be revised to indicate that the average concentration did not change significantly as a result of the additional focused sampling efforts conducted following the systematic sampling program implemented in 1993/1994."* The revised text regarding this issue was re-worded to again propose that the distribution of PCBs at this site can be adequately represented by an unbiased approach, without the need for biased sampling.

It has not been demonstrated that "concentrations may be adequately represented" by an unbiased sampling program or that the "distribution of PCBs at this site" can be adequately represented by an unbiased approach, without that need for biased sampling. These data do demonstrate the existence of the nugget effect. The distribution of PCB concentrations at this site may not be adequately represented by an unbiased sampling program, and might require a biased sampling strategy to meet site cleanup objectives. The last sentence from this paragraph must be deleted or it must also be included that, "...the distribution of PCB concentrations at this site may not be adequately represented by an unbiased sampling program, and might require a biased sampling strategy."

Response:

Please see the response to comment 16b above, which states that the previously proposed change would be incorporated in Section 4.3. Please also see the response to comment 17, above. There is no attempt in the Generalized CSM to present conclusions on what type of sampling program may (or may not be) appropriate in a particular Area. The development of appropriate sampling strategies will be incorporated in each Area-specific work plan and will be subject to USEPA approval.

Comment 19 (USEPA): Section 4.5

Page 4-11, Section 4.5, 3rd paragraph. The revised text states:

"On a lipid-adjusted basis, PCB concentrations in carp in Kalamazoo Lake are approximately the same as in Morrow Lake, and lipid-adjusted PCB concentrations in smallmouth bass at three of the six sampling stations within the Site are lower (and the other three locations higher) than in Morrow Lake. This comparison of fish PCB concentrations below Morrow Dam to those in Morrow Lake suggests that PCB bioavailability to smallmouth bass in a portion of the Site is similar or less than in Morrow Lake."

This revision to address USEPA Original Specific Comment #11 indicates that at half of the sampling stations, the lipid-adjusted PCB concentrations in smallmouth bass are higher. The conclusion seems incomplete and misleading in that it only indicates that bioavailability is similar or less than in Morrow Lake.

Response:

It is agreed that this discussion is incomplete. This discussion will be revised as follows:

"Comparing PCB concentrations ~~On~~ a lipid-adjusted basis in fish from sampling stations within the Site to fish collected in Morrow Lake reveals that PCB bioavailability to fish is considerably higher at most locations within the Site than in Morrow Lake. However, this is not the case for all monitoring locations of all species – lipid-adjusted PCB concentrations in carp in Kalamazoo Lake are approximately the same as for carp in Morrow Lake, and lipid-adjusted PCB concentrations in smallmouth bass at three sampling stations within the Site are lower (and the other three locations higher) similar or less than in Morrow Lake. The variability in these data indicate that understanding the potential influence of upstream sources on fish tissue PCBs may be important in understanding trends within the Site. This comparison of fish PCB concentrations below Morrow Dam to those in Morrow Lake suggests that PCB bioavailability to smallmouth bass in a portion of the Site is similar or less than in Morrow Lake."

Comment 20 (MDEQ): Section 4.7 – Paragraph 5

This paragraph includes discussions regarding and proposed conclusions from data and documentation currently being reviewed by the agencies. References to data or any proposed findings from unapproved documentation should not be included anywhere in this report. **This report is not the place to promote various arguments that have not been appropriately reviewed, evaluated, and accepted by the agencies.** This paragraph should be deleted from the report as should all other applicable text in the report.

Response:

The paragraph in question is not intended to promote an argument, but rather present data that have been available for eight years and submitted to the agencies in a variety of reports. These sediment data are useful in the development of this Generalized CSM that will be refined as appropriate as part of each Area-specific supplemental remedial investigation. Further, it is clearly stated at the beginning of Section 4. 7 that, "Uncertainty concerning the rates of decline and whether or not historically observed trends (where evident) will continue into the future will be assessed through continued monitoring as part of SRI/FS activities and other long-term monitoring activities." The paragraph will be retained.

Comment 21 (MDEQ): Section 5.1

The ecological exposure pathways identified in this report must include groundwater. Anywhere that infiltrating surface water (e.g., that was introduced after precipitation or flood events) or groundwater is exposed to contaminated soils/sediment, there is a potential for groundwater contamination and a groundwater exposure pathway. Water quality standards that may constitute various criteria (including groundwater/surface water interface criteria) are intended to be protective for various receptors, including aquatic and benthic life.

Response:

There are no complete and potentially significant groundwater exposure pathways at the Site. In the scenario described above, the ecological receptor exposure pathways that would be considered would be direct contact with Site sediments, direct contact with Site surface water, ingestion of Site sediments, and ingestion of Site soils. These pathways are all identified in Section 5.1 and will be quantitatively evaluated in the Area-specific risk assessment as appropriate. While consideration of various water quality standards, including groundwater/surface water interface criteria, will be relevant in certain aspects of remedial decision making in each Area, as stated on Figure 2 of the August 2008 *Draft Preliminary Remedial Goal Identification: Kalamazoo River/Portage Creek OU1 Site* prepared by CH2MHILL for USEPA, "Ecological receptors do not contact groundwater." No changes to the report are necessary.